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LETTERS

ON

OYSTER FISHERIES:

The Causes of Scarcity; the Remedies, &c.

BY

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DIRECTOR OF THE SOUTH OF ENGLAND OYSTER COMPANY.

EDWARD BUMPUS, HOLBORN BARS,
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P R E F A C E.

AT the end of March, 1876, when the Select Committee on the Oyster Fisheries was sitting, I received a summons then to give evidence, notwithstanding I had informed the clerk of the Committee that an unusual pressure of business altogether beyond my control would make it impossible for me to be ready at so early a date. I therefore wrote to the Chairman, requesting the adjournment of my examination, and then, availing myself of the Easter recess, threw my materials somewhat hastily into the form of a Memorandum, and awaited my turn; but on the 4th of May, after reference to the clerk and also to the Chairman of the Committee—whom I advised by letter that I intended to controvert evidence which had been given—I was informed by the latter, to my great surprise, and, as I understand, in a course of procedure strangely at variance with the usual practice, that, not being ready when summoned, I could not be heard. On that day Mr. Spencer Walpole's evidence was given, and, although some of his conclusions were remarkably in accord with my own, I felt that the divergence was even more important. I there-upon addressed the Memorandum in a letter to Mr. J. W. Malcolm, M.P., one of the members of the Committee, by whom I was informed that it was laid before the Committee. Whether or not it reached the members generally

I have no means of knowing, but it was not printed with the rest of the evidence. After-reflection having convinced me of the impolicy of allowing any misrepresentations or misapprehensions relating to the scarcity of the oyster to pass uncorrected, I took advantage of the opportunity of addressing myself to the *Field* to recast the Memorandum, and to give greater clearness to the views therein expressed. I further indicated some errors in the evidence laid before Parliament (in the Appendix to the Report, &c.), which could not be recognized until after the publication of that Report. These additions will, I think, be found to give greater cogency to my argument.

I venture to commend these Letters specially to the members of the late Select Committee, because some of the facts and theories therein contained are new—all are the result of personal observation.

Opportunity has been afforded by the republication of these Letters to make several verbal corrections, rendered needful by the non-receipt of any proofs when they were first sent to press.

W. FELL WOODS.

FOREST HILL,
25th April, 1877.

Letters to the "Field"

ON

OYSTER FISHERIES;

The Causes of Scarcity; the Remedies, &c.

LETTER No. I.

OYSTER FISHERIES.

SIR,

IN THE MATTER OF OUR OYSTER FISHERIES I fear we are threatened with legislation of a very ineffective kind, seeing that it will be based on evidence of a defective and misleading character. Being deeply interested in the success of our Company, and a member of its Board of Direction, I have had the entire management of our fishery for nearly eight years, during which period I have, by constant observations there and elsewhere, and by careful watching of oysters, old and young, found how easy it is to decide everything dogmatically by contenting oneself with a superficial general survey, or by carefully restricting the examination to some part only of the field of study. Having regard, then, to the publicity recently obtained, through the Blue Book, for the greater part of the evidence laid before the Select Committee on Oyster Fisheries, and to the very erroneous or imperfect statements with which it abounds, I should be glad, with your permission, to touch upon some of these from time to time, indicating facts which have come under my own observation, and which seem to demand an equal consideration with the statements published by the Committee, unqualified as those statements are by the contradictions they received.

Ineffective
legislation.

HEAT AND TRANQUILLITY.

I will begin with the theory held, in one sense so loosely, in another so tenaciously, by Mr. Frank Buckland, and to which he refers practically all the scarcity of our oysters; for, if the seasons be so regularly hostile as he alleges, a close time for consumption would make no difference except in the method of loss, since the destruction of the spat would be as certainly accomplished annually on the oyster grounds during the months of June and July as they are now

Heat and
tranquillity.
Mr. Frank
Buckland.

supposed to be in the fishmongers' shops. This logical view seems to me to be in effect that taken by Mr. Shaw-Lefevre. But what is this theory of heat and tranquillity? When Mr. Buckland enunciated his views in 1867, he said that "to keep spat alive required 70° to 80°;" but this estimate he has of late years greatly reduced, and in his recent evidence he stated that, "to put the young oyster into condition to adhere, he must have from 65° to 72°." And, again, "about 68° or 70° is what you really want." So that what was the lowest in the original theory for the maintenance of life of spat is now the highest required for its due adhesion; indeed, "if it is hotter than 72° it is too hot." I do not suppose anyone would ever have objected to this range of 65° to 72° as being otherwise than favourable for oyster spat; but does experience show that even this temperature is needful? I think

Hayling, 1869.

not. In 1869 I obtained at Hayling, in a large pond, from a small number of oysters, an excellent and extensive spat, which must have settled in a space of time when the temperature ranged between 57° and 68°. It may almost be asserted that it was 60° to 66° on the day of settlement. Again, in 1874, Mr. Johnson had his best fall of spat at Newtown between the 29th of May, when he observed a little floating, with a temperature which he gives me as 59°, and the 10th of June, when he found a considerable quantity attached. The temperature was then 60°, and did not fall at night below 58°. Making allowance for a not improbable error which I observed in a previous year in his thermometer, this, unless they failed to take a daily register, still indicates a lower temperature than mine in 1869. The evidence on this subject given by Mr. F. Wiseman, mainly a quotation of what he had previously published, is very interesting and valuable so far as it goes; but, as it takes no account of any other circumstances than the temperature, it is necessarily imperfect. Moreover, the same may be said of his registers of temperature; he does not take the maximum and minimum, but the height of the mercury at 8 a.m. and 4 p.m., whatever the state of the tide may be. It will, however, be noted by a careful reader of his data that the favourable weather during the usual period of spatting has not always been productive of spat. For instance (3079, Minutes of Evidence) "in 1870, fixed spat was seen on June 24, one spat on a shell;" yet "heat and tranquillity up to June 23." This seems further to imply subsequent adverse change, with a discovery on July 9 of a good fall, twenty on a shell. On what day it probably fell, and the temperature on that day, are not stated. Again, "in 1873 fixed spat was found on June 30; examined several shells, and found three spat;" yet "hot in June, and very favourable for spatting." These facts, and similar which I could adduce, suggest doubt as to the correctness of the theory. If Mr. Wiseman's evidence proved that a certain high degree of temperature was always accompanied by success, we should have advanced one step towards the inference that its absence might be the cause of failure. I have shown a good spat with low temperature, and Mr. Wiseman exhibits a bad spat in good temperature. To other causes, then, than to temperature must this success and this failure be attributed; and, though temperature is doubtless

Newtown,
1874.

Mr. F. Wiseman.

generally one of the influential elements in a successful spat, it is no extraordinary degree that is needed. In support of his position Mr. Wiseman has referred (3080) to the temperature at Hayling at the time of the first successful spat in 1866. But he has herein been misled, with many others; for, even if the registers were correct, which is not the case, they were not taken in the successful pond, but in one much shallower and hotter, and which issued in a complete failure. Hayling, 1866.

After all, it does not seem as if the late cold seasons had been marked by any great want of success in the Roach, judging from Mr. Wiseman's statement (3103-4) that his own beds have supplied so much spat that he has had to purchase very little during the last five or six years. Roach.

Although several other witnesses gave an opinion in favour of Mr. Buckland's views upon the question of temperature, none of them offered any ascertained facts in support, further than that good spats had been obtained in hot seasons; whilst, if we are to believe Mr. Polley that in the Channel there have been no young oysters since 1849, it does not appear that the very hot seasons, spoken of by so many, of 1857-8-9, and 1868, were of any advantage to those fisheries. Channel.

In my judgment the amount of wind is much more important. In ponds, where the spat is confined, I believe a force exceeding three, or at most four (gaff-topsail breeze), is very adverse; and in the open sea or estuaries it must tend further to its probable loss, through a wider dispersion than that caused by ordinary currents. It is owing to the fact that calm weather is usually coupled with warmth that the belief is so strong that heat is needful for a successful spatting time. The attempts to verify the theory by an artificial production of these conditions conjointly have hitherto failed. Mr. Harding, of Lynn, mentioned to the Committee—and has since more widely promulgated in the *Times*—his experiment, which produced even less than has already been obtained in small aquaria without any artificial heating. These considerations seem to prove that undue prominence has been given to the supposed necessity for heat; whilst, unfortunately, to refer scarcity mainly to this uncontrollable cause has a tendency to divert us from others as influential, if not more so,—from others, in fact, which are, in some cases at least, amenable to our regulation. Wind. Mr. Harding.

Forest Hill, September 6, 1876.

LETTER NO. II.

CLOSE TIME.

Close time.

AMONGST THE PROPOSALS made to the Select Committee on Oyster Fisheries was one to enact a close time to apply to consumption only—

The months suggested by some witnesses being from May to July inclusive (Messrs. Johnson, Williamson, F. Wiseman, Bowen and Walpole agreed to these);

By others from May to August inclusive (Messrs. Baker, Hart, J. Wiseman, Blake and Burt);

By others again from June to August inclusive (Messrs. Buckland, Austin, Harvey, Goody, Harding, Cousens, Bullock, Banyard and Hole, the latter-named gentleman would allow “seconds” to be sold in August);

And lastly, from June to September inclusive (Mr. Lovely).

These have reference to all but Channel or deep-sea oysters. The deep-sea oysters are recognized by many of these witnesses as falling into another category, and to be otherwise dealt with. Thus the months of close time from consumption proposed in their case were:

June to July inclusive (Mr. Johnson);

June 15 to August inclusive (Messrs. Walpole and Brazier);

July to August inclusive (Messrs. Goody, Pennell and Harvey);

August (Messrs. Polley and Banyard);

July to September inclusive (Mr. Hart).

Object.

The object of restriction is to increase the production of oysters, especially by securing the undisturbed delivery of the spat in process of gestation. Of course, therefore, the close time should depend on the dates at which oysters “sicken.” I need not quote any evidence to prove that June and July are usually admitted to be spatting months; even Mr. Hart, when he says he looks to July 1 for the beginning (!) of the spatting season in England, must thereby imply a state of sickness several weeks earlier. And he is clearly in error, for I have found every year, at one place or another in England, that on the 7th and subsequent days in June spat is found fixed—therefore probably fixed a few days earlier. But as to May, we have the statements of Messrs. Johnson and Banyard that oysters are sick in that month; and though Mr. Harvey says that “seconds” sicken six weeks later than natives, Mr. Bowen states that at Swansea “seconds” are sick in May, and Mr. Hole admits that they may spat in May.

I may add that I have known “white sickness” from May 9;

Also I believe “white spat” on May 9;

I have known “black spat” on May 15;

I have heard of “black spat” the first week in May;

I have known “floating spat” before May 20;

I have known “fixed spat” by May 20, or perhaps earlier.

Date of sickness.

Natives and seconds.

Floating and fixed spat.

With reference to the "sick" period of Channel or deep-sea Channels. oysters, the months of June, July and August were given by Mr. Pennell; from the end of June by Mr. Brazier; from the end of July and throughout August by Mr. Polley.

My own experience indicates that there are three classes of so-called Channel or deep-sea oysters, such as—

1. The "Capes," very large oysters, found at thirty miles from the French coast, off Cape Le Hève. These first show sick about the end of June, and spat from about the 1st of August. (But these oysters, brought to our beds before the end of April in 1867, had spat fixed by the end of June.)

2. Many beds of Channel oysters show "white sick" mid-July, "black sick" from the end of July, spatting chiefly towards the end of August, and continue black sick in September.

3. Other beds in the Channel, such as Portland, are in spatting condition from June and July.

The Committee in their Report recommend the infliction of a penalty for buying or selling oysters for the purposes of consumption during the close season, and they suggest a general close time from May 1 to September 1; whilst as regards the deep-sea fisheries they would leave untouched the period enacted by the Convention Act of 1868, viz., from the 15th of June to the end of August. Thus the Committee has, in the matter of consumption, to a large extent covered the period warranted by the facts; but the recommendation will probably be opposed. It is evident that Mr. F. Buckland and those who advocate the shorter time are governed by the same principle—not the interest of the oyster and its breeding, but that of the retailers, of whom he said that they did not desire that May should be a close month. This desire is not unreasonable on their part, since, no doubt, they do not see many "sick" oysters then. They forget, however, that with regard to natives and seconds in May, and to many deep-sea oysters in June, there is as much mischief done by devouring an oyster which is about to spat as by consuming one that is spatting. It might, perhaps, be objected that this argument in favour of the inclusion of May would be equally applicable to April, since the oysters which are sick, or nearly so, at the end of April, would, if saved, spat in May, and hence consistency would demand the addition of the earlier month. But it should be remembered that few oysters spat before the end of May. Theoretically, no doubt, they should be untouched after mid-April, to permit spatting in May; but, in the event of any settled weather towards the end of the latter month, a reasonable opportunity would be secured by a close time from the 1st of May. The deep-sea oysters will still be available for the shops in that month. It seems much to be regretted that those Channel oysters which spat largely in September should not at that time be protected.

I think, therefore, that any regulations enforced affecting consumption require a close time from May 1 to September 1 for all oysters (including such deep-sea oysters—say Class 1—as the "Portlands"), with the following qualifications, viz.:

(a) That the close time for deep-sea oysters—say Class 2—such as the "Capes," be from June 1 to September 1.

Seconds in
August.

(b) For the rest of the deep-seas, "Channellers,"—say Class 3—the close time should be from June 15 to October 1.

(c) I cannot see any reason why "seconds" should not be saleable from private fattening grounds, as suggested by Mr. Hole, from August 12, for the forcible reason given by him.

The question of the adequacy or inadequacy of a close time restricted to consumption, or to some only of the public grounds, has now to be dealt with.

General close
time.

Thames
estuary.

Removal of
oysters.

Whitstable
Company.

The Committee came to the conclusion that to forbid consumption, whilst permitting removal from, and the dredging of, public grounds, would have little effect; hence their recommendation of a general close time. But, unfortunately, they at once qualify this by proposing to entrust the Board of Trade with power, after inquiry, to shorten, vary, or determine this close season in any particular case, alleging that there are portions of the sea, especially the estuary of the Thames, where it is doubtful whether any close season from dredging would be required. The Committee are clearly right in admitting how small, comparatively, the difference would be arising from the prohibition of consumption, even if an extension of the close time for the deep-sea oysters were enacted as I propose. But the whole evil lies in the removal; and nowhere has this evil been more felt than in the estuary of the Thames and the Blackwater, and by none probably has more mischief in this way been wrought than by the Whitstable Company. To the misinformed public that Company usually appears as the great producer of oysters, whereas its true position is the greatest appropriator of oysters from the public beds, the largest buyer and largest feeder of oysters—a position perfectly satisfactory to all, so long as a judicious restraint is exercised in the appropriation from the public grounds. Evidently it is supposed by the Company (*vide* Mr. Baker's evidence), and believed by the Committee, that it makes little difference whether the oysters are left on the public flats or are removed to the grounds of the Whitstable Company. The same idea applies to removals from other public beds to other private grounds, and Mr. Walpole even proposed to legalize this universally during close time. But distinctions exist, which have hitherto been overlooked generally as well as by him. Before entering upon this topic, however, it is needful to notice the effort, made by most buyers in their evidence, to obtain a recognition of the principle of the continuous dredging of public beds, and the sale and removal of the oysters to the *fattening* grounds (Whitstable and elsewhere). Some of those whose lives have hitherto been spent in the practice of removing the oysters of all ages, until they at last recognize the complete destruction they have wrought—like Mr. Polley and the Brightlingsea men, by whom the Chichester Harbour fishery was destroyed—are now desirous to put a limit on the sizes; but Mr. Polley still advocates the removal of deep-sea spatting oysters in August to marketing grounds. Although the Committee have not recognized this claim, they have placed no check on their removal in the spatting month of September; whilst, as regards the public beds of natives in the Thames and Essex, they propose to permit continuous

dredging and removal of oysters to the Whitstable and other fattening grounds, without, moreover, any restriction as to age or size, thereby refusing all protection to the public native beds. Unfortunately, if in any case it be thought absolutely requisite to maintain dredging for cleansing purposes, an English oyster dredger considers that the operation involves removal of the oysters as a means of paying for the labour. This ought not to be.

Before completing the discussion of the removal of oysters from the public beds, I shall have to deal with several preliminary matters.

Forest Hill, September 27.

LETTER NO. III.

CAUSES OF SCARCITY.

AS INTIMATED AT THE CLOSE of my last letter (No. II.), the removal of oysters from the public beds is a question closely connected with another, viz.: What are the Causes of the Scarcity of Oysters? I propose now to offer a sketch of these causes, which, for a just estimate of their influence, must be divided into two branches, viz.:—

Causes of scarcity.

I. Those which affect spatting or breeding, and the spat while floating.

II. Those affecting fixed spat and oysters.

Some of these are probably remediable, others not.

As to breeding we may note—

1st. *The small proportion of oysters which spat in some seasons*—at least within the period which permits the development of the spat. This variable condition as to spatting power, whatever its causes, is noticeable in oysters taken from all beds. Although long personal observation makes it appear to me that the oyster is not only hermaphrodite, but also self-fertilizing, it seems to me possible that both sexual elements may not be always developed in the animal the same season, or, if so, not sufficiently in conjunction. This may be the cause of the smallness of the proportion of spatters in some seasons, induced, perhaps, by alimentary or climatic influences. Mr. Francis Francis has recently insisted that there is a separation of the sexes;* but he supports this only by ignoring the observations made of the anatomy and embryology of the oyster, and by relying upon an arbitrary inference drawn from its gregarious habit, viz., that nature provides their deposition in groups or banks, in order to secure their fertilization. We are equally entitled to find the reason in the suitable provision thus

Affecting breeding.

1st. Proportion of spatters.

Sex.

* This is an error. Mr. F. Francis has explained that he "inclined to believe in Dr. Kellart's theory" of a mutual fecundation (vide Appendix. Letters A, B, C, D; which correspondence shows the origin of my misinterpretation, and affords some useful comments upon, and rejoinders in support of, my views).

made for a lodgment of succeeding generations of falling spat; for it is certain that the influences which determine the settlement of an individual larva operate also upon the whole number emitted at the same time, they being carried by thousands the same distance to and fro.

2nd. I believe that *the removal of oysters to good fattening grounds* greatly curtails the number of breeders, the stimulus in one direction checking the development in another; hence it is the less surprising when we are told that "the stock of the Whitstable Company was tremendous in 1861, 1862, 1863, 1864, 1865, and 1866, yet no spat was found in the neighbourhood." In all probability the spat in that locality mainly comes from the breeding grounds proper, the Herne Bay and the public flats, not from those of the Whitstable Company, which are fattening grounds.* Hence the desirability of restrictions in working the public beds. The evil is greatly aggravated by the early age at which the oysters are thus removed. I believe that I was the first to prove that oysters will spat when less than a year old, but I regard spatting at the age of one year as quite exceptional; at two years and upwards it is more frequent.† The breed, locality, circumstances and seasons are all factors in determining the age at which oysters spat.

3rd. Moreover, as there are retailers ready to buy oysters poor in quality, if only low in price, many *under-aged oysters are taken for market*, both from the public beds and from the "several fisheries," where they should be retained for breeding.

The last two causes are forms of over-dredging, the objections to which are intensified when we consider them further in relation to the breeding period, as when we note the influences affecting the spatting in its early stages.

As sundry errors and much confusion exist in all the evidence laid before the Committee on Oyster Fisheries as to the "sickness" of oysters, perhaps I may be permitted to state some results of a large amount of personal microscopic observation. The terms employed in evidence before the Committee were used in very different senses, so much so that an expert could not always feel sure of the intention of the witness. The terms I allude to are "milchy, milchiness, in spat, in spawn, sickness, white and black sickness, white spat and black spat." Some of these were so used as to include all the rest, and distinctive terms were made interchangeable. Mr. Walpole has also fallen into this error, misunderstanding and misquoting the Irish Oyster Fishery Commission Report in his Report on Herne Bay, 1875, par. 4.

The only appropriate use of the term "milchy" is to confine it to the creamy state of the reproductive gland, when the eggs are developing within the gland which envelopes the body of the oyster. So soon as the eggs quit the gland to lie in the mantle and between the branchial plates, the oyster is called "white sick"—that being the colour of the contained creamy mass. This has been spoken

* The evidence of Capt. Burstal, R.N., and others as to the tides, quoted by Mr. Lovely, R.N. (3412), confirms my theory as to the origin of the spat at Whitstable.

† Vide Appendix, Letter D, December 9th, 1876.

of by Mr. Hart and others incorrectly, as if it were necessarily "white spat;" and they note another state, correctly, as "black sickness" or "black spat." The opinion offered by Mr. Austin, Mr. A. F. Pennell, and others, that these are respectively male and female spawn, is a very old but erroneous notion. It has been overlooked that there are several stages of "white sickness," of which the first two certainly cannot properly be called "white spat." These are segmented eggs, which sometimes become cardiform before they develop the ciliation of the egg. This is not a tuft, as erroneously described and figured by Mr. Hart in page 9, Irish Oyster Fishery Commission Report, but a delicate circlet of fine cilia. They next become shelled embryos or "white spat," and progress through further stages, corresponding first with the projection of a ciliated cushion; then with a developing "pad," or funnel-shaped collar; so passing through shades of grey to the condition of "black spat," or perfect larval form of the oyster, when the "pad" has become retractile and the organs thoroughly developed. The shells of the spat are not formed, as stated by the Irish Commission Report, by the pad, which is, until the spat has reached or nearly reached the black stage, always in advance of the shells, and has till then no retractile power.

Several stages

White spat.

Black spat.

Shells.

Reverting to the "milchy" state, immediately preceding the white sickness, I wish to point out the

4th hindrance to the spatting of oysters, viz., their *disturbance or exposure to abnormal conditions at this critical period*. They are liable to premature delivery of the eggs into the mantle, and also to the premature extrusion of the eggs from the parents' shells. This occurred at Hayling in 1866, in the pond specially prepared by Mr. Hart, where an utter failure resulted, the oysters in the very shallow and briny water becoming "white sick" and throwing off the eggs on the ground around them. It happened last year again in a large bulk of water, when, owing to an accident to a sluice, the oysters were disturbed, being twice removed to the bed, unavoidably exposed, and not finally laid till the middle of June, when they in a few days prematurely ejected an immense quantity of eggs. The same great waste is exemplified as the oysters lie on boats' decks when dredged up for removal in May, June and July, when the creamy mass of eggs or embryos is seen running out of the valves. This waste would rarely, if ever, occur were they left undisturbed in their normal condition. Similar effect is constantly produced in the cases of grey and black sickness. This is strong ground for a strictly close season from May 1st. I have no doubt that a close time ought to commence six weeks before oysters are black sick.

4th. Disturbance when milchy.

Hayling, 1866.

Hayling, 1875.

Summer dredging.

Proper close time.

5th. In taking account of influences which affect the *floating spat* or larval stage of the oyster, it is scarcely needful to dwell on those which are widely recognized, such as sudden changes of temperature, and rough and stormy weather; but I may suggest that frequently it is not the climatic conditions of the season generally, nor even locally, that are important, so much as those *climatic conditions at the precise periods of the floatation of the spat*. Most of the opponents of the heat theory prejudice their own case by overlooking this. That these periods of floatation

5th. Affecting floating spat. Climatic conditions when floating.

Opponents of heat theory.

differ in different localities, and sometimes in the same locality will vary somewhat with the seasons, or with the condition of the oysters according to the habit of the class to which they belong and the place whence they have been brought, is certain; but experience seems to point to nearly fixed dates in some places for the bulk which attaches. Probably, warm weather hastens the maturity of the floating spat, and thus shortens the distance it travels and the duration of the time of its exposure to enemies. That there has been much exaggeration as to the degree of heat required I have shown in my first letter (*Field*, September 9). There, too, I have indicated the influence of the wind; so that I may now pass to another cause, which, for the purpose of reference, I will call the

Duration of exposure.

Wind.

6th. Action of tides.

Degree of maturity.

6th. On *the action of the tides at the moment of the extrusion of the spat* much depends. I cannot accept Mr. Hart's statement that black spat settles upon the first clean surface with which it comes in contact. I know by experience it is otherwise. It must first attain a certain degree of maturity. That maturity may coincide with the moment of its delivery and first contact with a "collector," or it may not. The stage needed to lead to its deposit on its native bed, or within a suitable area, is contingent on the time required to reach or return to the spot, and therefore on the state of the tide. Spots usually distinguished by the deposition of spat in calm weather, or at a time of favourable maturity of the floating spat, must often fail to receive it when the circumstances are otherwise.

7th. Changes of currents.

Colne.

7th. *Changes of currents* would operate. I am under the impression that, since five years ago, a causeway has severed the water communication which formerly existed inside Mersea Island, connecting the mouth of the Blackwater and the Colne. The change corresponds with the period of failure in the latter river mentioned by one witness. The current thus stopped may have been valuable for the transit of the spat from the former to the latter.

8th. Cleanliness.

Needless dredging.

8th. It is generally admitted that *want of cleanliness, and of freedom from slime in the cultch or collectors* of an oyster ground, is inimical to the attachment of spat. Dredging the ground, prior to spatting time, obviates this. But, since the *under* surfaces of objects will retain a fitting condition for a long period, there seems little reason on this score for continuing the dredging on public grounds during the proposed close time.

9th. Sewage.

9th. In some localities the discharge of *sewage* in the neighbourhood of oyster fisheries must be highly injurious to the floating spat. Where this discharge is supposed to take place on the ebb, the greater part of the spat given off from neighbouring grounds about or during the ebb, if the ground be above the outfall, must be carried into the poisoned water and destroyed. Such a case I know. Only in the event of a very fortunate retention of the larvæ by the parent until perfect maturity, and a lucky concurrence of all circumstances favourable to their immediate settlement, will their safety from this means of destruction, and any chance of a copious spat, be secured. As there are places where this ruinous influence may be regarded as certainly effective, so it

seems highly probable that the increasing volume discharged into the Thames and its tributaries may act injuriously on the floating spat near its mouth.

10th. The *living enemies* of the floating spat, some tethered like the anemones, others in constant motion like the fish and shrimps, do not require individual mention; but it must not be overlooked that their influence, being in proportion to their numbers, varies greatly in accordance with the annual influences on the fecundity of their tribes.

10th. Living enemies.

Effect variable.

It will be convenient to defer the enumeration of those causes of scarcity which affect fixed spat and oysters until my next letter.

Forest Hill, October 25.

LETTER No. IV.

CAUSES OF SCARCITY (*continued*).

I BEG now to resume my sketch of the causes of scarcity under the heading—II. Those which affect fixed spat and oysters.

Affecting fixed spat.

1. It sometimes happens that large numbers of spat settle without any attachment or development. This failure, when it occurs, is so wide-spread that its range seems to indicate cold as the cause. The valves then generally remain for some little time thickly clustered in contact with the collectors.

Spat settled, not attached.
1st. Cold. (?)

2. If a floating spat attaches and develops, it begins to assume the character of a young oyster. From microscopic observations it appears to me that the attachment, which has been spoken of as so great a puzzle, is not by the "attraction of cohesion," as Mr. F. Buckland suggested to the recent Committee. It is a very curious fact that there is an absolute uniformity as to which side of the developing spat lies next to the object of attachment, whilst those which fail to develop are found in all positions—positions such as they ordinarily assume for temporary purposes of rest. There is no difference in the degree of convexity of the original valves, as some have represented; but if we open an oyster so as to leave it lying in its deep shell—that shell, in fact, which is the development of the attached valve of the spat—and place the hinge uppermost (that is, furthest from the spectator), the vent will be found invariably to the left. This fact, which does not seem to have been recognized hitherto, being characteristic of every developing attached spat, is evidently requisite for that development, and must, I think, throw light on the cause of attachment. No theory yet suggested takes account of, or appears to fit in with, this fact. It seems to involve the hypothesis that uniformly the same side of the mantle, which may be called the right side, precedes its fellow in exuding the material for the extension of its valves, which extension (being at this stage required by the maturing of the larval form) demands the exudation, which exudation renders the right side of the mantle alone adhesive. Deposition of shell by

Fixed spat.
Cause of attachment.

Shell deposition of larva.

Of embryo.

the spat, or rather by the embryo during its progress into the larval form, is from the surface generally of the enveloping mantle, but not from the ciliated portion of the embryo, which portion is for some time in advance of the shells, and is not retractile. The development of the shells when adhesion commences is no longer in the same form as heretofore—a mere heightening of their concave walls—but a bending outwards of the lip of the near shell, and then an extension of a flat surface along the face of the “collector.” The original attached valve of a developing spat does not rest on its apex, but at an angle of about 25° to 50° . This position can only be attained by deposition from the outside of the pad, that side being a prolongation of the mantle. I, therefore, regard this adherence as an involuntary act, consequent upon the maturing of the floating spat, which demands an extension of its valves; the exudation of the required material commences on the exterior right side of the mantle, which, as the spat frequently rests on this side with closed valves, would, when they re-opened, be easily brought into contact with the neighbouring substance; to which, if not slimy, it adheres, and by its simultaneous deposition upon its adjacent valve and the object permanently connects them. The same adhesive characteristic of shell deposition may frequently be observed in the subsequent growth of the oyster, and always, it should be noted, in the same right shell, which has then become the deep shell of the oyster, thus proving its continuous precedence in deposition. When thus adherent in great profusion, after a slight development, large numbers often die, without any warrant for regarding them as overcrowded; this loss, the cause of which is doubtful, though possibly it may be found in minute living enemies (the shells are not consumed) is seldom so extensive as the last mentioned.

Of oyster.

2nd. Minute living enemies.

3rd. Occult influences.

3. Still later, some occult influences operate on natural beds, as well as in the inclosed. I have received letters from the Roach, expressing wonder at the cause, when, “after a winter, whose *weather* could not have affected them, ten out of twenty on a shell had died.”

Affecting young oysters.

4th. Sundry.

4. The enemies which damage the young oyster when it has increased in size need no enumeration; it is well known that they are dealt with to some extent by the dredging and scarifying of the oyster beds.

Dredging.

The vexed question now is, whether, if the oyster advancing to the condition of brood, half-ware, and ware, be retained in part upon the public breeding grounds, the operation of dredging is to be continuously applied: or, on the same supposition, whether they shall be left undisturbed during the summer; or whether their removal to private *fattening* grounds throughout the summer, as at Whitstable, shall be permitted, for the sake of securing by dredging a condition of the ground supposed to be better fitted for the reception of a spat,—for which spat, it should be observed, the public will then be chiefly dependent on the produce of the neighbouring fattening beds; or, finally, whether, for the same reason, the removal shall be allowed to private *breeding* beds.

Removal.

We must add to our list those causes of scarcity which affect marketable oysters.

Affecting marketable oyster.

5. There is a very large sale of native and other oysters to the Continent, from Essex, Whitstable, other Kentish grounds, and Shoreham. The demand, however, I believe, fell off last season (1875-6.) 5th. Export.

6. Formerly a great number of oysters were obtained by us from the French coast; the larger part are taken now by the French, to whom the English boats also sell their catch, thereby avoiding the loss of time involved in returning to this side with their cargoes. 6th. Foreign sale of catch.

7. Mr. Polley, a dredgerman, and Mr. Brazier, an oyster merchant and agent (not dredgerman, as he is called in the Report of the Oyster Fishery Committee), have shown that deep-sea oysters are brought in during spatting time. These are sold to local merchants for market, or to lay for market; at least one-third of them die, and the spat of all is destroyed. 7th. Destruction by dredgers.

8. Theft from private grounds, especially where the passage of barges is permitted, is frequent. There being no prohibition against having dredges on board, these are often put over the side under cover of the weather-boards. It has been well said that the law ought to regard the possession of dredges by barges in the same light as the carrying of skeleton keys. 8th. Theft.

9. To meet the scarcity in this country, some millions of French oysters, chiefly from Arcachon, have been imported during the last two years; but great losses have been sustained, either in transit or from the effects of temperature following those of transit. On most grounds, I believe, they require two seasons to fatten, whilst their tenderness makes them most risky oysters to winter in our waters. And this suggests the last cause of scarcity which I desire to point out, viz.: 9th. Snow.

The effect during winter of chilled water after falls of snow. From this cause the loss of "seconds"—*i. e.*, oysters other than natives*—though it is not confined to them, is very great; during the last two winters (1874-5 and 1875-6) it has been immense. It may be said that this cause has always existed; but, unless I mistake, it has of late years been greatly aggravated by the increased land drainage, by which a larger bulk of snow and chilled water is more rapidly delivered, and with a proportionate intensity of effect, on the fattening grounds, which lie chiefly in creeks. There is a fashion in the consumption of oysters, as of other foods. Did the public eat them more largely before Christmas, millions would be consumed which are available only so long as the snow holds off. The large quantity of Dutch oysters imported during the year 1875, for immediate consumption, for a time, by its competition, apparently increased the supply, only to be the indirect occasion of much ultimate decrease of stock. The perhaps rather hardier oyster, supplanting the weaker at the earlier part of the season, seems to have subtracted from, rather than added to, our resources.

Forest Hill, December 20.

* Mr. Walpole's description of natives (vide the Report on Herne Bay, 1875, p. 4, par. 6) is inaccurate.

LETTER No. V.

CAUSES OF SCARCITY (*continued*).

Causes of
scarcity.

Over-dredging.

Chichester
Harbour.

IN FURTHER illustration of some of the causes of scarcity which have been enumerated, I may mention that the fishery of Chichester Harbour—wrongly classed by Mr. Polley, when before the late Select Committee of the House of Commons, amongst the deep-sea fisheries—was entirely destroyed by him and his Essex men. The coastguard used to notify to the boats the prohibition of the removal of under-sized stuff, with which the local men—whose boats, remaining on the spot, could be searched—were obliged to comply; whilst those from Essex put to sea with all they took. The local fishermen can only regret that Mr. Polley's present views, as expounded to the Committee, were not held and put in practice by him some years ago.

Deep sea.

Mr. Polley further told the Committee that there had been a great failure of young oysters in the Channel since 1849, whilst in 1843 they were abundant. It is somewhat remarkable that it was about the year 1843 that real deep-sea oyster fishing began; previously it was confined to the in-shore beds in from two to nine fathoms of water. Perhaps the alleged decrease may be partly due to the subsequent extensive dredging.

Ireland.

It was stated before the Committee that, in regard to the Irish fisheries, great mischief accrued from the purchase of young oysters by English merchants; and, in proof that under-aged oysters are so removed, but also that it is done in opposition to the desire and interest of the English buyers, I can mention a fraudulent case at Belmullet—west coast, and north of Clew Bay. Sample and price were tendered and accepted from a man there; but we received, instead of our order, bags filled with specimens of all ages, from spat to oysters five inches across, together with cultch and rubbish despatched as dredged up. We could obtain no redress.

Removals.
Ireland.

Doubt was expressed before the Select Committee of the intention of the Irish Oyster Fishery Commissioners (1868 to 1870), as to whether their objection to the removal of young oysters from Irish beds referred to their transportation to England only, or also to other Irish beds; but one of their number, Mr. Hart, having in 1869 obtained some beds in Ireland—among them one which was not publicly known to be stocked—dredged up the whole, and removed them to another bed. I should go further than the Commission, and should deprecate the removal of any under-aged oysters from Irish beds, whether to English or Irish grounds, so far as *fattening* grounds are concerned; and I fail to see why any restriction upon transplantation to English *breeding* grounds should be sought without an equal application to those of Ireland.

Let us now turn to the evidence which was offered as to the Colne and Blackwater.

If the facts were correctly stated, these rivers were formerly equally productive of spat; now, the latter only is, to any extent, successful. Yet it was said by the witnesses that the treatment is alike. I have already indicated (Letter No. 3, Oct. 25, 1876) a possible cause of the changed result in the former, in the diversion of a current by which the spat may formerly have been supplied from the Blackwater; but a prominent distinction lies in the fact that, whilst in *both* the shifting of the oysters is continued during May and the following months, in the Colne, according to the evidence, they are laid on the best *fattening* grounds, but in the Blackwater on growing and *breeding* grounds; by which, in the latter case, the disturbance of their normal functions would be less pronounced. The question remains, why the Blackwater produces less than formerly, its treatment unchanged save in the partial removal of cultch—an undoubted evil. Diminution—which I suppose may have begun in adverse seasons or by largely-increased consumption—naturally intensified the dredging as the oysters became scarcer and more valuable, increasing the disturbance of, as well as still further diminishing, the stock, at a time when the circumstances demanded additional care in their protection. The proportionate reception of spat by its private beds seems variable, affected no doubt by the tides and currents, Mr. Harvey being specially fortunate in position. If the removals from the public grounds to the Blackwater beds ceased before May, it would be more favourable for the spatting. This was doubtless of less importance when the oysters were more numerous, but goes far to account for the present continuous famine. Mr. Bullock, a dredger, in reply to Mr. Shaw-Lefevre (2909), said there were plenty of oysters to supply the river with spat, if only they had a good season, meaning suitable weather. Mr. Banyard, oyster merchant, adds (2971), that “this river has been very greatly improved by continuous dredging . . . and very much extended . . . there is now a beautiful soil, clean and fit for the reception if Providence smiles.” Such weather as Mr. Bullock demands we have had this season (1876); but one who dredges yearly in the Blackwater assures me that there is no spat on its public ground this year. Thus it also seems, according to Mr. Banyard, as if the cleaner they had made the river, the worse was the result so far as the spat was concerned. They fail to recognize the real causes. Mr. Banyard unconsciously explains to some extent the great increase of borers in the river, when he states that no dredging is done till summer; they should be destroyed earlier, before depositing their spawn, if we are sincere in our efforts to diminish the scarcity of the oysters.

Colne and
Blackwater.

Currents.

Removal to
fattenn.

Need of close
time.

Erroneous
views of
Messrs.
Bullock and
Banyard.

Borers.

Forest Hill, February 5, 1877.

PROPOSED REMEDIES AND OBJECTIONS.

Proposed
remedies and
objections.
Regulations.

HAVING CONSIDERED THE CAUSES OF SCARCITY, we may now examine the remedies which have been urged by some, and as strongly reprobated by others. These consist for the most part of regulations, which it is proposed to apply to public fisheries, viz.:—

- (1.) As to the *size* of oysters which may be removed;
 - (2.) The months during which they may be taken; and
 - (3.) The extent of area over which dredging may be permitted.
- It has been further proposed—
- (4.) To forbid the sale for consumption of oysters from private grounds during certain months;

And, finally,

- (5.) To revise the arrangements as to grants of fisheries.

General or
local.

It has been suggested, on one hand, that the regulations should be of general application; on the other, that local bodies should be appointed to make regulations affecting particular beds.

1. Restriction
of size;

1. In order to give effect to the first proposal, namely, a restriction as to the size of the oysters which may be removed, a gauge ring has been recommended, and various sizes have been named, naturally in accordance with the growth of the oysters in particular districts; thence some force is given to the suggestion that the settlement of this question should be left to local bodies in the respective localities. But it seems to be entirely overlooked that the restriction really needed is one of *age* rather than of size. No English oyster should be eaten under full four years at least: therefore, I shall presently suggest that no young oyster of less than three years old shall be removed from a *public* bed to any *store* or *fattening* ground; for, until the age when it is needful to prepare it for market, the young oyster should be kept in a situation favourable to breeding. The gauge test, if it be thought requisite, must be based upon this age, and be of size accordant with the local kind of oyster; and to check the removal of under-aged oysters, the ring for the three-years-old should be of measure corresponding with the largest diameter of the ordinary full-sized of the 1st of September three years after birth, and the prohibition should then be made of any oyster less than three years old, *or* capable of passing the ring—unless full three years of age. A *general enactment* should fix this age, leaving to the local authorities the settlement of the corresponding gauge. If left entirely to the local bodies, there would be great danger of these yielding to attempts at premature removal by the selection of an inadequate gauge; whilst the age test would permit all dwarfed or so-called Tom Thumb oysters to pass. I think it quite open to discussion whether four years, instead of three, ought not to be the limit for public-ground *native* oysters. The age test for *con-*

of age.

Why?

Gauge test.

Age test.

sumption should be full four years, and the gauge in accordance, For consumption. on the principle already laid down. I know no reason why the restrictive age test for consumption should not apply to the private grounds.

2. When proposals are made to protect the public beds by prohibiting the removal of oysters during certain months, objections are raised that the grounds, if not dredged during summer, will become foul and unfit to receive spat, and the oysters will be destroyed by their natural enemies. These objections have been already noticed (Letter III., sec. 8, Oct. 25, 1876), and will be further met by regulations to be presently suggested. It can hardly be disputed that some beds require nothing of the kind. But the objection is illustrated sometimes by the statement that neglect of dredging has proved most injurious to the grounds occupied by the Herne Bay Company. It should be observed, however, that, according to the evidence, the alleged failure to dredge sufficiently was not confined to the summer, but extended to the whole year, owing to their occupation of a space too large for cultivation with their insufficient means. A careful consideration of the facts relative to the Herne Bay Company and the adjoining public grounds will, I think, modify the prevalent opinion concerning them, and support my recommendations as to restrictions. This consideration can be best given when dealing with the question of grants. Mr. Banyard (Oyster Fisheries Report, 2977) thinks the moving of cultch by dredging during spatting time essential to enable the spat to fix on both sides of a shell; but he attributes such instances to a wrong cause. I could show him plenty of undisturbed shells which receive spat on both under and upper surfaces. 2nd. Close time for dredging.
Herne Bay.
Shifting of cultch.

3. One witness before the Committee, Mr. Cousens, complained of a close time of three years at Boston Deep, resulting in a falling off of the take from 1,000 a day to 50. I have since heard it reported that the period of exclusion was not correctly stated; if it were, it was no doubt too long, and should not have been continuous, except as to the removal of oysters; nor should it have been extended to the whole bed at once. I believe that in every case of supposed want of benefit a sound explanation could be given. There is another argument employed against any restriction upon the removal of oysters—viz., that *numbers are not essential* to obtain a spat. No one can be more fully alive to that fact than myself, having had experience of it when I attempted to test it;* but it holds good only when all the conditions are favourable to the few. The larger the number in a free current, the greater the chance of success. This is of more importance under tidal influences than in inclosed beds. Should the condition of the oysters be unfavourable as to the percentage spatting, the total gross result will probably be in proportion to the number laid, although perhaps less than would result from a smaller number in a condition of better percentage; whilst, if the condition be favourable as to a high percentage of spatters, the weather, &c. being equally bad or good, the larger stock will give the much larger gross result. Although the crop 3rd. Time and area.
Question of number.

* Vide Letter VIII., errata 1, p. 37.

is not necessarily in proportion to the stock, those are most likely to be successful who act, in open waters, as if it were.

The great error.

Lastly, as I have already pointed out (Letter II., Sept. 27, 1876), it is supposed to be quite immaterial whether the oysters be removed from the breeding grounds, provided they be stored in the same neighbourhood. But the case of Whitstable and the estuary of the Thames bears out my observations, that this is the great error which underlies our failure. I consider that an *annual fall* demands, as the only prudent course, the maintenance of a stock on *breeding* grounds, and that no dependence should be placed on the stores of fattening grounds. Were the latter sufficient, the "commons" in the estuary of the Thames would seldom lack a fall; whereas, we are told by the Whitstable objectors to restrictions, on the one hand, that when the Whitstable stocks were the largest there was no spat in the neighbourhood, and, on the other, that the heaviest falls took place when the stocks of the Whitstable and other companies were at their lowest. Both facts harmonize with my theory. Mr. Shaw-Lefevre's questions to Mr. Walpole (Oyster Fisheries Committee, 3728—3743) elicited proof that the scarcity in the Thames estuary must be referred to local causes; but they both failed to see that to the reliance on the stocks of the *fattening* grounds, as if they were equivalent to a stock on the breeding grounds, was the failure largely traceable.

REGULATIONS.

Removals.

I have shown, I think, that there are many causes of scarcity of spat, and several besides of the scarcity of oysters—some preventible, others not. Amongst the most effective of the former is the removal of oysters from the public beds, especially in the months of May to August. To stop this seems objectionable to the fatteners of oysters, as depriving them of stock; still more so to the breeders, especially grantees, whose holding depends on the due stocking of their grounds.

Suggestions.
Regulations.

Having regard to the facts I have detailed, and to the interests of all parties, I venture to suggest twelve regulations for the purpose of increasing the chances of spatting, and of diminishing the scarcity of oysters. It will be seen that they differ somewhat from any proposals hitherto made.

Although I have already offered the first in Letter II. (Sept. 27, 1876), where the reasons are fully given, it seems desirable to restate it in this connection.

Close times :
1st. Consumption.

1. That a close time for consumption (from May 1 to Sept. 1) be enacted for all oysters (including such deep-sea oysters—say Class 1—as the "Portlands"), with the following qualifications, viz.:

- (a) That the close time for deep-sea oysters, such as "Capes"—say Class 2—be from June 1 to Sept. 1.
- (b) For the rest of the deep-seas, "Channellers"—say Class 3—the close time should be from June 15 to Oct. 1.
- (c) I see no reason why "seconds" should not be saleable from private fattening grounds, as suggested by Mr. Hole, from Aug. 12. These would not generally be likely to

spat after that date, whilst they are very liable to be lost if not sold before Christmas. Close times:

2. That no oyster or brood shall be removed from any public bed during the close time. 2nd. Removals.
3. That at no time shall young oysters—that is, those under three years of age (in the case of natives it should be four years)—be removed from the public grounds to *fattening*, but only to breeding, grounds. 3rd. Under age.

The reason for permitting the transfer to the latter is that no injury is done thereby to the oyster, whilst without it the “several” fisheries granted for breeding purposes, and other breeding grounds, cannot obtain stock at all, except at the full market price of natives. Oysters above the age of three years would, of course, be removable to any grounds; natives four years.

4. That a part of every public bed—one-quarter or one-third, perhaps—should in rotation be preserved for two years from any removal; the period of closing to be reckoned from September 1. 4th. Continuous close time.

This will assist in retaining a variety of ages, especially two years old, so as to encourage a variety of date in the emission of spat, and thereby help to secure a chance of favourable weather.

5. That no cultch shall be taken from any public oyster grounds. 5th. Cultch.

This will hinder the removal of brood too young to be detached, as well as maintain the requisite collectors.

6. That no oyster shall be sent to market under *four* years of age. 6th. Market age.

7. That the exportation of oysters during close time shall be prohibited. 7th. Exportation.

8. It is worthy of consideration whether beds within the three-mile limit should not be prohibited to all boats save those of a prescribed neighbouring district, whose fisheries may have contributed to the spat; or otherwise, whether so-called “foreign boats” should not be under obligation to sell only to the local fisheries. 8th. Districts.

Such a plan would have prevented the spoliation and destruction of fisheries like those of Chichester and Langston Harbours, &c.

9. That a daily or weekly licence fee should be payable by all boats dredging on the public grounds, especially on those grounds said to require summer cleaning; and the fund used for whatever labour might be found needful in watching, buoys, harrowing if five-fingers, or dredging if borers, appeared. 9th. Licences.

10. That the destruction of the borers during the *open* period might also be encouraged by payment out of the fund. 10th. Borers.

11. That barges and vessels passing over private oyster layings shall be prohibited from having on board any dredge, the theft by this means being probably very considerable; and barges and vessels grounding on the beds should be heavily fined. 11th. Dredges, &c.

12. That all private oyster beds, including grants, should be registered and certified by the Board of Trade as either (1) breeding, or (2) fattening beds. 12th. Registration.

The time has come to choose between the alternatives of risking some possible danger from vermin, or inflicting a more than pro- Alternatives.

bable loss by disturbing, and especially by removing, the oyster; the latter has been long followed with disastrous result. The former course might at least be tested for a few years. In the moderate degree now proposed, it can scarcely issue in harm; it seems certain to result in good.

Forest Hill, February 12.

[Though we have not, perhaps, in every instance coincided in the arguments used by Mr. Woods, we most cordially agree in his deductions and recommendations, so far as they are possible. We are rather inclined to doubt whether the "age" test could be worked, but we have no doubt as to the beneficial nature of Mr. Woods' advice, and unless regulations in this direction be adopted we may give up oysters altogether.*—ED. of the *Field*.]

LETTER No. VII.

ON GRANTS OF SEVERAL FISHERIES.

Objections.

GRANTS OF FISHERIES from public grounds are strongly opposed by local fishermen and by the owners of neighbouring beds, both parties being, by such grants, prevented from resorting to those grounds for brood. But unless wholesome restrictions can be enforced, so as to prevent denudation of the beds, such exclusion is most desirable. If, however, the beds are not exhausted, regulations of an effective kind, thoroughly enforced, are better than grants. The opponents also allege, frequently with good reason, that the grants have been made to individuals or associations without capital, and this in spite of warning given at the time of inquiry; that the grants have been made on too large a scale, as has been suggested in the case of Herne Bay; that the exclusion of the public has been detrimental to the culture of the ground, and has tended to diminish the supply of oysters—these objections being also illustrated by a reference to the Herne Bay Company.

Herne Bay.

It may be well now to consider briefly whether the results attributed to the Herne Bay Company's grant do really exist, and have been rightly attributed. Additional light has been thrown on this question since the sittings of the Oyster Fishery Committee. It will be remembered that two inquiries into the working of the Herne Bay Company have been held, and these have led to the decision that a part of their ground has not been kept in sufficient cultivation; that it has, therefore, failed to produce spat; and that part of the fishery ought to be resumed by the Board of Trade. Now Mr. Lovely, R.N., on behalf of the Herne Bay Company, gave evidence before the Oyster Fishery Committee (3461—4), showing that in 1875 and in the spring of 1876, whenever on the same day boats were set to work on both grounds, the produce on

Exaggerations.

* In reference to "age test," vide Letter VIII., penultimate clause.

the company's ground was thirty to fifty per cent. better than on the unreserved public flats. But I would now invite attention to another fact. This last season, 1876, a spat has fallen on the Herne Bay ground, whilst under precisely the same condition as was pronounced by Mr. Walpole to be insufficient cultivation, thus disproving the alleged cause of previous failure. The open public ground has, I believe, not been so fortunate. Accordingly in November last, Mr. Coleman, of Whitstable, on its being reported that effect would be given to the Inspector's recommendation, congratulated the public—which really means the Whitstable fishery—on the cheering prospect of this portion of the fishery reverting to the public, and on their ability to appropriate this brood this year, 1877: in other words, on the prospect of removing the means by which the fishery on the Herne Bay and neighbouring grounds may be revived.

Threatened
danger.

It is clear that in this case of Herne Bay and the Thames estuary exaggerated value has been attached to this condition of cultivation, or a needlessly high standard has been set, seeing that a spat has fallen on this ground at least as freely as, I believe more abundantly than, on the adjoining still continuously-frequented public flats. It may be worth while to note the history of these flats as sketched in the reports of Mr. Walpole. From that of 1874 we find that the original opposition of the Whitstable Company to the grant was based on the fact that their own ground, whilst "probably better adapted than any other in the world for the fattening of oysters, is almost useless for breeding purposes;" and that they, "therefore, had been in the habit of obtaining brood and half ware from other places, and of laying them on their own grounds to fatten;" and that they and others "were in the habit of largely relying for their brood on the produce of these flats." He gives a table, borrowed from the Report of the Irish Oyster Fisheries Commission of 1870, and adds: "The witnesses" at this (his own) inquiry, "agreed that this brood was chiefly obtained from those portions of the flats which were vested, in 1864, in the Herne Bay Oyster Fishery Company." But another inquiry was held by the same gentleman in January, 1876; and in his report he recalls the fact that "all over the flats in the estuary of the Thames spat is found in patches;" that, "in 1858 and 1859, the falls of spat were very heavy over the whole of the flats, and particularly so in that portion now occupied by the Herne Bay Company;" that the Whitstable and Essex boats were greatly stimulated by this; "that the Whitstable Company alone, which had obtained from the flats 36,070 wash of brood in 1857-8, took 49,319 wash in 1858-9, and 48,058 in 1859-60." And thus "the great spat"—taken, he it observed, to a large extent before it was twelve months old—"was by this time exhausted. The take fell to 11,851 wash in 1860-1, to 5,134 wash in 1861-2, to 2,419 wash in 1862-3, and to 2,398 in 1863-4," and, I may add, to 914 in 1864 to March, 1865; and this is the course to which Mr. Coleman looks forward with pleasant anticipation this year.

Whitstable
Company.

Thus, before the spat of the year 1876 will have time to breed—which it should be allowed to do on its native soil, to the benefit of the district—it is to be prematurely carried off and laid on

Dangerous
action.

the fattening grounds of the Whitstable Company, of which Mr. Walpole writes, on the evidence of the Whitstable witnesses themselves, it "is almost useless for breeding purposes." Mr. Coleman and other of our opponents seem unable to imagine any middle course between the unrestricted exposure of public beds to spoliation by the fishermen of Whitstable and Essex and their surrender to private companies. I am glad to notice that Mr. Walpole was impressed with the danger of withdrawing this ground, and thereby leaving it a spoil to the neighbouring dredgermen. Unfortunately, he recognized no alternative; but if this danger was evident at Christmas, 1875, how much greater has it become since last season's fall of spat. But in this particular case, in which there is no disputing that something has been done by the Company in possession, nor that that something has issued in a sufficiently cleanly condition of the ground for the reception of a spat, it is certainly harsh, and seems scarcely just, to snatch away the small prize with which fortune may now enable them to balance the adversities of the past. Under proper regulations, in their hands even, it should be much more for the public benefit than if thrown open to the destruction with which it is again threatened. The returns quoted by Mr. Walpole, and the complaints made on all hands of the failure of the public grounds in the Thames and Blackwater—still open to all comers, in accordance with the plan in general favour—are a sufficient answer to the assertion of the immense superiority of that method. The young oysters should be kept on the ground until they have had fair chance of breeding, and meanwhile proper attention should be paid to their culture by detachment from the cultch, &c. It cannot be pretended that this course has been followed either on the commons or on Herne Bay grounds; and it is to this that I largely attribute the rarity of good falls of spat in the Thames estuary. There was scarcity on the flats in years prior to 1857, although they were then all open to the public; and there has been scarcity since the heavy falls, when still open to the public (for the falling off from 1860 to 1864 on the commons could not be the work of the Herne Bay Company, which did not exist till the latter year); and such will be the rule during the continuance of the system. As I have already stated, the only prudent course, if we desire to secure an annual fall, demands the maintenance of a stock on *breeding* grounds, and that no dependence should be placed on the stores of fattening grounds. Were the latter sufficient, the commons would seldom lack a fall. Mr. Coleman has suggested that it was only the appropriation of "the great amount of young oysters taken previous to 1861, stored and nurtured through the three great years of plenty on the best known grounds," which "served to supply the public through seven years of failure." In other words, their early removal to fattening grounds was followed by a failure of spat for many years; so that the gain to the public was, at the best, the superior quality and much higher price of the removed oysters (as Mr. Coleman allows), while a much greater loss accrued by the years of diminished production.

Proper course.

Failure of open grounds.

Causes.

Effects of removal.

Official suggestions.

Many persons who favour the system of grants, recognizing the truth of some of the objections, have, like Mr. Walpole (*vide*

"Oyster Fisheries Committee Report," 3680), recommended that they should be confined (1) to Small Areas, and made especially to local Fishermen; or, like Mr. Cholmondeley Pennell, that they should be (2) Large Grants to Co-operative Societies of Dredgermen.

Messrs. Walpole and Pennell.

In reference to the proposal of making (1) Small Grants as suggested by Mr. Walpole, it may be remarked that it is evidently founded on a misconception. It is thought that their existence in France proves their applicability to this country. But the circumstances are entirely unlike. In France they are granted on the ebb-dry, or spring-dry, banks under the control of the Government; the channels in which parent oysters are laid, and some of the banks themselves, being the property of, and stocked and managed by, the Government, the grantee has only to prepare his plot and lay collectors to receive spat furnished by the Government oysters, and he can even obtain in some cases a gift of oysters for his ground. In England the ground available is generally channel below low-water mark, which needs stocking to begin with, and which no one would be so foolish as to stock unless a large area were secured to him, the dispersion of the spat being quite likely to supply neighbouring patches which contribute nothing, and to leave his own bed without result. In France, again, the Government affords a protection to oyster grounds, which is utterly wanting here, and whose absence exhausts the patience and capital of enterprising persons. It does not seem, however, that the system of small grants answers with our neighbours. This is pointed out by Mr. Hall in his valuable report to the Board of Trade (Oyster Fishery Committee, Appendix 13, Arcachon). The best course will be found embodied in the regulations I propose as applicable to grants.

1st. Small grants.
French fisheries not analogous.

Finally, I have to consider the working (2) of the Co-operative Dredgermen's scheme. The special attention of the Committee was invited by Mr. Farrer to the grant of several fishery made to the Dredgermen's Co-operative Society of Emsworth. It was very cautiously referred to by him as a most interesting experiment, on whose success, however, it might be somewhat premature to offer a decided opinion. Again, in the draft report of the Oyster Fishery Committee proposed by Mr. Shaw-Lefevre (sect. 43), that hon. member writes: "Except in two cases," one being that of "the Emsworth Fishery, the concessions have not resulted in any profit to the undertakers, or in any increased production." How far this idea of its success is warranted will presently be seen. In November, 1874, in a letter to the *Times*, it was much vaunted by Mr. Cholmondeley Pennell as a great success, upon which he congratulates himself as its sole originator. It is therefore peculiarly well adapted to illustrate the mistakes which may be made, and the erroneous inferences which may be drawn, when information is derived only from official sources. Mr. Pennell speaks of this fishery as "especially interesting, not only as proving, by the unanswerable logic of facts, the results of proper protective measures, but as affording, as in the case of the Emsworth fishery—which, when handed over to individual enterprise, was little better than a bank of mud—an example of the success-

2nd. Co-operative dredgermen.

Emsworth.

Supposed success.

Originated by Mr. C. Pennell.

The facts.

ful application of the co-operative principle to this important branch of marine industry." But what were the facts? It is true that the Emsworth Channel had been thoroughly exhausted of oysters, but it had a very excellent and easily-cleaned bed. This Mr. Messum admitted; indeed, the fall of spat in 1871 proves that it was already good for settlement before it was worked. That Mr. Pennell must have been mistaken in describing it as "little better than a bank of mud" seems further proved by the figures which he and others give. A Board of Trade grant of this Channel was made, on the recommendation of Mr. Pennell, on July 24, 1871. The dates are important. Prior to the date of the grant—in fact, from 1866—individuals or companies at both the lower and upper ends of the Channel had established breeding and growing fisheries, and the oysters laid by them had thrown spat, which had been deposited about the whole Channel, thus reviving the fishery. This fact was proved by me at the inquiry at Emsworth, I having obtained on the ground brood the produce of the three or four preceding years. Surely the persons thus stocking the fishery, if any, were entitled to some share in the result. It was suggested by me that either all should co-operate under a regulating order, or the ground be divided into three portions, the northern end being allotted to the existing fisheries there, the centre to the proposed Dredgemen's Company, and the southern end to the South of England Oyster Company, whose creek abutted thereon; but the Channel was handed over, rent free, to a society originated for the purpose, without means, or with exceedingly small means, on the understanding, however, that they were to stock the same. This, as foretold, they have never done; but they proceeded immediately in September or October, 1871, to dredge up the oysters, selling in the same year, according to Mr. Pennell's report, quoted by himself in the *Times*, "250,000" of what he calls the "indigenous produce of the fishery," but really derived as I have stated. In the extracts which he furnishes from his reports, he tells us further, writing in September, 1872, "the dredgemen are confident there will be at least three times as many this season" (1872-3), that is, 750,000; and "judging from their reports, and the very large proportion of oysters that I found of a size to be marketable in another twelve months, I have no doubt that next year, 1873, the catch will be again trebled." In other words, within two years of the grant being made, they would be able to send into market three and a quarter millions of oysters, to say nothing of those too small, all of which must of necessity have been on the ground when the fishery was handed over. I suppose, however, there must be some error in his figures, since, in another extract quoted by him from a report made to the Board of Trade in January, 1873, he writes that "this season," in 1872-3, when they had "only been fishing for about two months out of the seven," "they had already dredged 83,488, or nearly twice the entire catch of the whole of the preceding season," which would apparently change the 250,000 into 45,000. As these reports are not printed, I have been unable to reconcile them; but the evidence of Mr. Messum, who represented the Company, was laid before the Committee (3350), and if we take his much lower

Erroneous
inferences.

figures, it will still appear that this was no "mere mud bank." Neither were these oysters the result of the Company's labours, nor "an example of the successful application of the co-operative principle." For Mr. Messum is clearly in error when he ascribes the take of 310,000 in 1873-4 to the spat which fell in 1871, shortly before they obtained the ground, as that stuff would be only two to two and a-half years old, and quite unmarketable. The spat of 1871 would begin to tell possibly in 1874-5, when three to three and a-half years old. In that year they did, in fact, increase the sale to 380,744 (Messum, 3350). These smaller figures, furnished by Mr. Messum, prove that there must have been on the ground in 1871, when they received the grant, at least a million of oysters, brood and spat. With this increased production it is evident, contrary to the impression of Mr. Shaw-Lefevre, the Company had nothing to do. Since 1874-5 the take has much declined.

The only labour involved is dredging the oysters, for which the men have received 5s. per hundred—nearly all they fetch. The boon to the fishermen was no doubt great, but it can hardly be considered just to those who originally had legally equal rights, and equitably had greater, being the providers of the spat. The fishermen would have been benefited under any circumstances. Restrictions might have been established without injustice or discouragement to the enterprise of local cultivators, and without the results to the public being prejudicially affected.

Since the foregoing statement in reference to Emsworth was first written and laid before the Oyster Fishery Committee, the return made by the Emsworth Dredgemen's Co-operative Society (Limited) has been published in the Blue Book (Appendix, No. 7). The method in which it has been tabulated is most misleading, since it represents the sales as if effected a year later than they were actually made. Those assigned to 1872 should be 1871-2 (that is, from September, 1871, till or through the winter)—chiefly, in fact, the earlier year (*vide* Mr. Pennell's report). This appears not unnaturally to have misled Mr. Hall, who, in his last report on the fishery, quotes the sales as of 1872-3, which should, as proved by Mr. Pennell's visit in September, 1872, belong to 1871-2. The error is, of course, continued through the rest of Mr. Hall's figures. The evidence of Mr. Messum confirms the correctness of Mr. Pennell's date, and establishes the inaccuracy of the table. Mr. Hall's interpretation of the table has completed the error, and may probably invalidate the inferences he has drawn. I expect the final figures in his report, quoted for 1876, really refer to 1875. Mr. Messum is in error as to the date of the grant; it was not 1870, but the end of July, 1871.

Erroneous
returns.

Effect.

If a rumour—which seems to receive the countenance of Mr. Hall in his latest reports to the Board of Trade, recently ordered to be printed—be correct, the number of oysters taken off the Emsworth grant may have to be qualified to the extent of the poaching committed by the Co-operative Society on their neighbours; but in that case is proved the accuracy of my disregarded caution at Mr. Pennell's inquiry, that the grant to these persons would only afford them an easier opportunity to dispose of oysters so obtained; whilst Mr. Cholmondeley Pennell's anticipations and

congratulations with regard to the improvement of the fishery, and to the benefit to the neighbours by the improved conduct of the men, seem equally to have participated in an unsound basis. On the one hand, if the stock sold be genuine, the state of the ground was not such as was supposed by the Board of Trade, nor did the increased production arise from the society; the spat obtained is acknowledged to be derived chiefly from other sources. On the other, if the stock sold be not genuine, the supposed success is to that extent imaginary, and the grant has increased the facilities for the disposal of stolen goods, to the disadvantage of all the neighbouring fisheries.

I am compelled to defer further remarks until my next letter.

Forest Hill, March 3.

LETTER No. VIII.

GRANTS OF SEVERAL FISHERIES (*continued*).

Grants.

RECENT EVENTS may serve to illustrate some of the statements advanced in my last letter; the whole of the circumstances are worth relating. Towards the middle of February, the Report of the Inspectors appointed in 1876 to inquire into the state of the Oyster and Mussel Fisheries, established under orders made by the Board of Trade, was printed by order of the House of Commons. Therein appeared a report on the Langston fishery, in which the Inspector, not unnaturally, disclosed the existence of a considerable number of oysters, and the parts where they were laid. Within a few days the boats of the Emsworth dredgermen appeared, and, under pretence of shrimp trawling immediately below the boundary of the fishery, were found to be both trawling and dredging the oysters on the South of England Oyster Company's ground (the Langston Fishery), sometimes at night, sometimes even by day. It is always most difficult to catch these boats, which, when observed, generally have the start, and are quickly beyond the bounds of the fishery. But on the 21st of February, two watchmen, about 8 p.m., noticed two boats at work; succeeding in cutting in between them, they got across the stern of one and seized the dredge rope with one hand; the poacher instantly drew his knife, thrust back the watchman, and cut the rope, leaving the dredge in the Channel. The man, however, was fortunately recognized. The second boat meanwhile escaped. Later in the evening the recognized man was again found trawling on the oysters. On the 23rd, as the two watchmen were being relieved in a rythe running into the Channel, they saw a boat making hauls with a dredge. All four watchmen jumped into

Emsworth
poachers in
Langston.

the boat, and pulled down under cover of the mud banks; they were of course observed as soon as they reached the Channel; nevertheless they gave chase, following the poachers down the Langston Harbour, out by Fort Cumberland, through Hayling Bay, right up Chichester Harbour to Emsworth. The proverbial length of a stern chase was further increased by the accidental absence of one oar; but the watchmen never lost sight of the boat. On reaching Emsworth they took its number; the men, with its contents, had prudently disappeared. The superintendent of the fishery next took the needful steps to summon the recognized poacher, first, for dredging; secondly, for trawling on the 21st; also the owner of the boat seen dredging on the 23rd. He presents himself with the necessary papers to swear the summons before the magistrate (Capt. H.) at two o'clock, and upon explanation is met by the reply, "D—— the oyster fishery; you must leave the papers, I'm going out." "At what time can I have the summonses? they *must* be served to-night!" "Between five and six." And accordingly they had to be waited for. Finally, when the hearing came on, case No. 1 was proved, and the defendant ordered to pay a fine of ten shillings, and costs fourteen and sixpence, within a fortnight, the bench pressing that the second charge should be withdrawn! Case No. 3 was dismissed by the magistrates, on the ground that *the number of the boat was of no value*, the men themselves must be recognized. It consequently seems that this feature of numbering and registering the boats, upon which the recent Committee and the Board of Trade appear to place much reliance (Mr. C. Pennell's report, quoted by Mr. Farrer, 20; Messrs. Malcolm & Blake, 3579—83), is perfectly useless. Hitherto there have been some pains successfully taken by the poachers—as alluded to by Mr. Hall in his report on Emsworth Channel (Return, Feb. 8, 1877, p. 12)—to conceal these numbers; but now a slight disguise or concealment of their own features will probably render them secure. The Company loses, beside the oysters, some pounds and the time of its servants in the prosecution, with the unfortunate result of making more manifest the weakness of their means of defence. The Emsworth poachers subscribe to pay the small expense which falls on them, and are no doubt well covered by the oysters obtained. The identification of the poachers is most difficult. Watchmen, strangers to the neighbourhood, are the most likely to be independent and to protect the property of a fishery, and the least likely to league themselves with the fishermen; but to them the recognition required must be impossible. The chances of successful prosecution are excessively small. It certainly does not seem that Mr. Pennell has any reason to congratulate himself that the establishment of the Dredgemen's Co-operative Society at Emsworth has relieved their neighbours from their unwelcome attentions; and, as it has assuredly not benefited the fishery itself, the experiment, tested by this instance, can scarcely be claimed as a success. Unfortunately, all the encouragement falls to those who are mere appropriators of oysters already on the fishery, whilst the neighbouring enterprising capitalists, who re-stock their grants at great cost, find themselves practically their helpless prey.

Action of
magistrates.

Result of
scheme.

SUGGESTED REGULATIONS.

In relation to the management of public grounds in rivers and harbours, I would suggest :

1st. Grants.

1. That grants of them should only be made when they have been thoroughly exhausted, and have no prospect of replenishment from the contiguity of private oyster grounds.

2nd. Regulating orders.

2. But that, if situated amongst private beds, and found to be in course of revival or likely to be replenished therefrom, they should be placed under suitable stringent regulations, such as I have already proposed (Letter VI.), for the benefit of the district.

3rd. Admission of foreign boats.

3. If, on the other hand, the public ground, not being exhausted, is probably a provider, in part, of the spat which falls on neighbouring private beds, those beds having thus already some advantage, it appears worthy of consideration whether this ground, after being placed under the proposed regulations, should not be open to dredging by so-called "foreign" boats.

4th. Cleaning grounds.

4. That if it be found *imperative*, in any case of public ground placed under regulation, to continue some cleaning of the ground and catching of vermin during the summer, these should be secured either by a fund derived from fees chargeable on the boats permitted to dredge, or by imposing a condition of service on the private beds of the district benefited.

5th. Notice of bill.

5. That before introducing a Bill to confirm any order of the Board of Trade for a several fishery, notice should be given to those who have opposed at the inquiry. It happens now that the result of an inquiry, and the intention of the Board, can only be known by the very uncertain announcement in the *Times* of the passage of the Bill through one of its stages. The introduction may chance to take place very shortly after the inquiry, or may be delayed for a year, giving the impression that it has been abandoned, and thereby preventing opportunity of effective opposition.

6th. Area of grants.

6. That, in the event of any exhausted ground being made the subject of grant, it should not be broken up into separate grants, since the result of these is a lottery. There are usually many portions of a fishery where little, if anything, ever falls, owing to which accident of position the most enterprising may get nothing. If there be many local occupiers, they should be combined.

7th. Conditions of grants.

7. That when a grant is made to a local combination, or to an individual or company, it should be under a pledge to clean the ground, and to expend a certain fixed sum within three years in the purchase of *British* or other suitable oysters to stock it. Portuguese and American are quite useless for such a purpose.

8th. Protective measures.

8. That some measures should be devised for, or assistance given in, the protection against poachers of the grants of several fisheries. The depredations committed by the co-operative dredgers (the undertakers of the Emsworth Channel Fishery) upon the Oyster Merchants Company (the Emsworth Fishery), as described by Mr. Hall in his report; and the robberies perpetrated by the same persons upon the South of England Oyster Company (the Langston Fishery), described by me in the earlier part of this letter; together with the use of dredges by barges passing through fisheries, mentioned in Letter VI., are only specimens of what, by

its frequency and extent, must prove a great discouragement to enterprise in this important department of industry. The so-called artificial cultivators of oysters in this country are entitled to every possible aid, since they cannot obtain the great economical advantage of female labour as do the fisheries of France.

9. That the pollutions, by sewage or otherwise, of harbours, or the mouths of harbours, which are the site of oyster fisheries, should be stopped. 9th. Pollutions.

(Evidence before Select Committee.)

ERRATA.

Before bringing my remarks to a conclusion by contrasting with my proposals the recommendations made by the Committee in their Report, it seems needful that I should correct one or two of the erroneous and misleading statements contained in the evidence received and printed by the Committee. Many, of course, must be passed over; these are a sample: Errata.

1. Mr. Hart made several touching the experiences of the South of England Oyster Company, at Hayling, between 1866 and 1869. He conveyed the impression that only one bed was used for breeding in 1866, and one in 1867, both being successful; no breeding in 1868;—this latter statement was subsequently modified in a somewhat indefinite manner;—small result, he believed, in 1869, but he was absent. The facts are these: The bed prepared by Mr. Hart in 1866 was a complete failure; from a very large number of oysters two or three spat alone resulted. Only by the insistence of one of the Directors were about 50,000 of the oysters—which were being removed by Mr. Hart to the bed he had prepared—retained in the supply pond, on the ground that no chance offered by different conditions ought to be neglected. Eighty hurdles were put in, and to this fortunate circumstance alone the spat of 1866, in pond Fusaro, was due. The spat was not even looked for in this pond until suddenly found by one of the men, very considerably developed. In 1867, two adjoining beds were used by Mr. Hart; one utterly failed, the other was a magnificent success, giving a gross result of perhaps 200 spat for every parent oyster. In 1868 all the beds used by Mr. Hart failed. In 1869, Mr. Hart laid down in one bed 425,000 oysters of his own selection; the spat obtained was about 290,000. He has forgotten that he was not absent until after the settlement of the spat. In another bed, being willing to test my belief in quality against number, and desirous of proving my theory that the progeny of an oyster would follow its parentage, I laid 16,500 natives, and obtained an excellent spat of about 950,000 natives—over fifty for every parent. This, on a large scale, established the maintenance of the characteristics of the different breeds.* I may here mention, incidentally, that in the same bed I obtained this last season, 1876, from 60,000 native and own-bred native oysters, some twenty-four millions of spat—a remarkably fine gross average of 400 for every parent. 1st. Hayling.
1866-9.
Mr. Hart.

* Vide Appendix, Letter E., Dec. 2, 1876.

2nd. Langston.
Board of
Trade.

2. Langston.—The return made by the Board of Trade (Report, Appendix No. 2, p. 209) erroneously states the grant made under the Langston Fishery Order as of 25 acres; it should be about 225, of which part only is capable of cultivation.

3rd. Langston.
Mr. Hall.

3. Whilst upon the subject of the fishery at Langston, I may notice that a wrong inference might possibly be drawn from the expression used in Mr. Hall's report thereon as to the age of oysters laid and retained in the Langston Channel; hitherto they have been of all ages, so that no hindrance to spatting could arise from any defect in that respect. The ascidian to which he refers is the *Cynthia*, a great pest, the poisonous character of whose juice makes any attempt at removal from the cultch dangerous; the irritation caused to the eye or broken skin by the liquid squirted on application of a knife is, unfortunately, very considerable, and the fishermen will not risk it.

4th. Arcachon.
Mr. Hall.

4. Arcachon.—In reply to a question from Mr. Shaw-Lefevre (3869), Mr. Hall assented to the proposition that at Arcachon the fishery is entirely uncovered during the ebb-tide; but this is not quite exact. In the first place, the channels are never dry, and they were the original source of the spat; and, secondly, much of the artificial fishery is only exposed during the ebb of *spring* tides—a feature of considerable importance.*

(Report of Select Committee.)

THE RECOMMENDATIONS OF THE COMMITTEE.

Recommendations of Committee.

That, unhappily, the recommendation of the late Committee (*vide* Report) is, unconsciously to its members, utterly inadequate to the necessities of the case, will, I think, be clearly seen when we recall its items.

1st. Close time.

1. They recommend, it is true, a general close time—not applicable to deep-sea oysters—from May 1 to September 1; but the Board of Trade may vary or annul this at pleasure. In fact, the Committee suggest exceptions where the restrictions are most needed, as in the estuary of the Thames. It will, therefore, practically amount to a close time *for consumption* only.

2nd. Deep-sea.

2. They have done nothing to extend the defective close time enacted by the Convention Act of 1868 for deep-sea oysters, although the French Government would willingly accede to such an extension.

3rd. Removal.

3. Clause 4 of the Report is so worded that apparently, although it is recommended that *deep-sea oysters* should not be sold under $2\frac{1}{2}$ in. or 3 in. in diameter, they *may be removed*.

4th. Under age.

4. There is no prohibition of the removal of under-aged oysters from any public fishery.

5th. No distinction.

5. No distinction is recognized between removals to breeding and to fattening grounds.

6th. Penalty.

6. The only infliction of penalty recommended applies to the purchase or sale of oysters for consumption during close time.

* This is so, and, as our correspondent says, is a feature of considerable importance.—EDITOR of the *Field*.

The proposed changes have thus been reduced to a minimum, and the effect will be commensurate.

AGE RESTRICTIONS.

In reference to the question of restriction upon age or size of native and second-class oysters, you, Sir, in a foot-note to my letter No. VI., expressed a doubt whether the age test would work. I am not anxious to press its adoption *alone*, although to my mind there is little practical difficulty; but I see perfect ease and perfect security if the age and gauge tests are co-effective. Unless the latter be based on the former, it will be merely a delusion, whilst every legitimate oyster liable to rejection by the rough test of the ring would be accepted and passed by the test of age. The general law would be most easy of adaptation to local circumstances in the manner I have indicated in letter No. VI., sect. 1. Age test.

CONCLUSION.

Legislation for the protection and revival of our oyster fisheries is sorely needed, and should be promptly applied; but it needs to be based upon something better than the unenlightened views of the dredgermen, or the equally imperfect ideas of the self-styled "heat and tranquillity" school. Conclusion,

W. FELL WOODS.

Forest Hill, April 5th.



APPENDIX.

CORRESPONDENCE IN THE "FIELD."

Letter A., November 18th, 1876.

From MR. FRANCIS FRANCIS.

THE BREEDING OF THE OYSTER.

MR. FELL WOODS has written a good deal that is interesting about the oyster, and it is evident that he has studied the subject; but when he says that I have "insisted" on some point as regards the natural history of the oyster, I must correct him, for I should hardly be likely to "insist" where matters at the best are but doubtful and unsettled. All that I say is, that Nature would scarcely dispose of the oyster in beds unless it was for some necessary purpose, and I think it most likely that the production of the oyster is more or less concerned in that arrangement. I have not "insisted that there is a separation of the sexes." I never believed in such a theory, and therefore could not very well do so; but I inclined to believe in Dr. Kellart's theory for the want of a better, and because it accounted for many points which otherwise could not be accounted for. He admitted the oyster to be hermaphrodite, but not self-fertilizing, and suggested that it was necessary that there should be a mutual fecundation carried out in some way, but which we have not yet had ocular demonstration of. This is not an unreasonable thing, as many hermaphrodites are not self-fertilizing, but require mutual fecundation for reproduction. I do not "ignore" what has been discovered in embryology, though it is a science in which I am but indifferently read; and that being so, about a twelvemonth since I had a considerable correspondence with my poor friend Mr. Newman—than whom, I suppose, there were few, if any, better authorities—and I read carefully a pamphlet written by him on this subject, and still the matter was left undetermined in my mind. Mr. Fell Woods's account of the later stages of development as regards the embryo of the oyster is all that can be desired, but he has to trench upon hypothesis when he treats of the earlier stages, since he can only then deal in "seems" and "possibles;" and when I meet with "seems" and "possibles," I know that doubt is not far off. "It seems to him possible that both sexual elements *may not* [the italics are mine] be always developed in the animal in the same season, or, if so, not always sufficiently in conjunction." Exactly so. Mr. Woods is clearly in doubt upon the very point that we are all in doubt about. He has his theory, which it would appear is no more certain or ascertained than anyone else's. Then he goes on to assume that "this *may* be the cause of the smallness of the proportion of the spat in some seasons." The notion is ingenious; but what oysters are now they always have been. Mr. Woods then follows on with climatic influences as affecting the spitting, and we all know that temperature and wind disturbance are very variable and capricious, and that such things may now and then affect injuriously or favourably, more or less, spots of spat during the period of floatation. I quite recognize and admit all this; but what I do not admit, and never will admit, is, that this is in any way a leading cause of the scarcity of oysters. This cause of scarcity has always existed more or less, and the scarcity in one place or year has always been balanced in another. So also have the breeding arrange-

ments of the oyster existed in the same state ever since it was an oyster; but such peculiar hermaphroditic variations as those suggested by Mr. Woods would not occur to all the oysters, I presume, at the same time, even on one bed, still less all round the coast; and still less, again, would they be inherited in a sort of perpetuity for fourteen or fifteen years. What we want to arrive at is why oysters are so scarce, and these scientific explanations, though interesting enough in themselves, do not meet or account for the case at all, because the causes put forward in these explanations have always been more or less present; and, if we were to admit them as at all largely affecting the cause, oysters should always have been as scarce as they are now. In fact, I don't admit these reasons at all, since they are merely a part of the ordinary life of the oyster. It is my belief that it is very much to the exigencies of the private beds, supplied most unscrupulously and mischievously from the public ones, that we owe the scarcity of oysters at present. Over-dredging, no close time, and the deportation of under-sized oysters, have done the work. Let me draw up a code of laws for the management of the oyster fisheries, and see them carried out, and I would undertake to say that in four or five years I would reduce the price of oysters down to one shilling a dozen again.

Before concluding I may just add one suggestion. Why has no one yet shown us spat produced beyond doubt by a solitary oyster? Surely the experiment must have been worth trying; but no one ever has done so. We are told that one oyster can spat some acres of ground. Why does not somebody put an oyster in a position to do it? That would settle the question; and one fact like this would be worth all the theory that ever was published.

Letter B., November 25th, 1876.

From Mr. W. FELL WOODS.

THE BREEDING OF THE OYSTER.

MY present letter must be considered as parenthetical; it is intended simply as a reply to the courteous letter of Mr. Francis Francis, which appears in your paper of the 18th inst. I am sorry to find that I have, unintentionally, been guilty of misrepresenting his view as to the sex of the oyster. I had misinterpreted his expressions—influenced, I think, first, by the report of the Irish Commission, which intimated that one member of it, not Mr. Francis, supported the view of Dr. Kellart, thereby inferentially excluding Mr. Francis from belief in that theory; and, secondly, because Mr. Saville Kent, writing in the *Field* on April 22nd this year, interpreted Mr. Francis's expressions, without contradiction, in these words: "Singularly, too, Mr. Francis's rejection of the prevalent idea in favour of the oyster being hermaphrodite, so that one isolated individual can originate or re-stock a bed, and which has no doubt considerably promoted the evil, is placed on record simultaneously with my own observations in favour of the animal's separate sexuality." This sentence is, I now perceive, no doubt susceptible of two interpretations, but to me at the time it corroborated my impression, and still seems to me intended to convey Mr. Kent's belief that Mr. Francis rejected hermaphroditism, and believed in "separation of the sexes." In this rejection, and in his remarks generally, I certainly did consider that he "ignored" anatomical and embryological observations. His disavowal and his explanation of his views I gladly accept, and, seeing that I was not without apparently strong ground for my statement, I am sure he will accept this apology for my misinterpretation. I do not remember to have seen the pamphlet by Mr. Newman to which he refers, and shall be obliged if Mr. Francis will favour me with its title.

A main difference between Mr. Francis and myself seems to be one of temperament. I suppose it would be impossible for me to write, as he does, that "I do not admit, and never will admit," &c.; yet no doubt we are both equally

open to the influence of evidence. We differ in our method of stating our personal convictions; he probably as much overstates his as I understate mine. When I state that "it seems to me possible that both sexual elements may not be always developed in the animal in the same season, or, if so, not always sufficiently in conjunction," I do not imply that I myself, after frequent comparison of observations, have much doubt on the subject, but I thereby recognize the fact that, however true it may be, it would in the nature of things be scarcely possible to prove it. It would not be convenient here to go thoroughly into the evidence on this and kindred points, nor is it at all needful for my argument. I have there stated the probable reasons for an undoubted fact—viz., the varying and sometimes small proportion of oysters which spat, that is to say breed, at any given spot. This I advance as one of the causes of scarcity, which cause we cannot ignore, whatever the reasons for it may be. Mr. Francis next, commenting on some of the other statements, says, "I quite recognize and admit all this," but proceeds to combat them as if I had made them leading causes of the scarcity. If Mr. Francis has read my first letter (*Field*, September 9th), I do not see how he can attribute to me that opinion. I there not only opposed such an idea in regard to temperature, but produced stronger evidence than had, I think, ever been previously given against it. True I have witnessed the influence of wind, and assign it a prominent place; but Mr. Francis has, in fact, made a premature attack, unless he really disbelieves what I assert—that all these causes can be shown to exist, playing their part with variable intensity of effect, in different places at different seasons, and therefore contributing in variable degree to the general results—that now one, and now another—sometimes here one and there another simultaneously—produces the widest effect, whilst many co-operate for successive seasons. I have not represented these as merely occasional causes, neither do I allow that they are all in constant, simultaneous, equal action, but I regard them as at all times, though in variable degree, affecting our supplies. I do not think it wise—especially in reasoning with those who, in Mr. Francis's forcible language, "have committed themselves to a theory which nothing can, and nothing shall upset"—to ignore any of the causes. Moreover, I venture to think that, if he really means what he says, when he writes, "I don't admit these reasons at all, since they are merely a part of the ordinary life of the oyster," and fancies he is arguing against my views, he cannot have read the second, third and fourth (the most important causes), and the eighth and ninth causes, mentioned in my last letter.* His succeeding words, however, do but echo some of my statements, and I therefore expect we shall be found to approximate more closely than at first seemed likely.

Will he forgive me if I say, in conclusion, that I think him a little unreasonable when he asks, "Why has no one yet shown us spat produced, beyond doubt, by a solitary oyster?" I have offered to assist, but I have never yet found anyone willing, or perhaps I might say able, to offer an aquarium fitted with and maintaining all the requisite conditions, analogous to those of nature, for the accommodation of a single oyster; and without this last condition the experiment would of course be valueless, whilst there must be no renewal of the water for many months, lest the result should be prejudiced. It cannot be tested with certainty in any kind of oyster pond. In the absence of this desired "one fact," perhaps we may be able to establish it inferentially. At least we lose nothing by this interchange of views.

Forest Hill, November 20.

* Letter No. III.

Letter C., December 2nd, 1876.

From Mr. FRANCIS FRANCIS.

THE BREEDING OF THE OYSTER.

IF I was in the slightest degree uncourteous to Mr. Woods I beg his pardon. It was not my wish to be so, but I certainly was a little surprised, and not agreeably so, to find myself credited with a theory which I was not conscious of ever giving expression to, and which indeed I did not believe in, and also to be told that I ignored facts to which I had given the best attention I was capable of, but which, so far as I could interpret them or weigh their full meaning, did not seem to bear out Mr. Woods' theory. I have already said that Mr. Woods had written much that was interesting, and there are many points in his earlier letters on which I most cordially agree with him. But nothing that he has said in his last letter* gives me any reason to alter my opinion as to the *natural* causes of scarcity (if any). I fully admit that there are plenty of enemies to the oyster, that weather influences affect them at times unfavourably, and that there may in individual cases be a hitch in their procreative arrangements; but what I take my stand on is the certainty that these peculiarities have always existed, that they are, as I have said, a part of the life of an oyster, and that Nature *has* always (and always would if uninterfered with by man) balanced the deficiencies caused by such injurious effects—good in one place against bad in another, a good year against a bad one. A bad year might happen, and this would no doubt somewhat affect the supply for two or three years; or two bad years might happen, and affect it for four or five years; but when it comes to fifteen or sixteen, then it goes beyond my credence. And when I find from experience and investigation that during the whole of this time, on grounds where there are still plenty of oysters, in frequent instances fair spat have been got; while on other grounds which have been over-dredged, and where very few oysters are left, there has been very little spat, if any; and that year after year, for sixteen years, the same results ensue, and we have been expecting *that oyster to cover that acre* of ground with spat, which we have been told he is capable of doing, and yet throughout all that time, with every possible variety of wind and weather and temperature, he has steadily refused to do it: I really think I am justified in drawing the conclusion that he can't do it, and that it is high time, after having had the way stopped to all improvement by a stubborn belief in this theory for sixteen years, and thereby made oysters 600 per cent. dearer than they were, I think, I say, that the public would be justified in objecting to the theory altogether as a foundation for a method of treatment, and in demanding a new method of proceeding altogether. But when we see that, *pari passu*, while we are refining upon these nice points of embryology and weather-ology (I don't know the proper scientific term for it), and trying to guide our steps by them, the French, who *were* formerly in worse case than ourselves, have, by a few practical regulations—such as I and those who join me want to see introduced into this country—smothered their grounds with oysters, and have more than they know what to do with, I think the argument in favour of my deduction becomes irresistible.

The pamphlet lent me by Mr. Newman consisted, I think, of papers read by him before some scientific society, I am not quite sure which, but I fancy the Zoological. As Mr. Woods puts it, I quite see that there might be a difficulty in procuring undoubted spat from that one oyster in any tank; still, if there is so much difficulty in arriving at undoubted proof on this point, it seems to me a desperate error to permit such a doubtful theory as has been erected here to govern our entire legislation with respect to the oyster fisheries. And again, if, failing in being able to prove from actual experiment that one oyster can reproduce itself, we are to arrive at the fact inferentially, as Mr. Woods re-

* Letter B.

marks, then I claim that the inference from sixteen years' example is wholly and entirely in my favour. The principle upon which that fatal Sea Fisheries Commission (which did much to destroy our British fisheries, by removing all restrictions of every kind, which will all have to be re-imposed) proceeded, was that you could not dredge an oyster fishery so bare as not to leave sufficient oysters behind to re-stock it thoroughly in any good season. I knew at the time that this principle was fatal, and would end in just the destruction which has resulted from its application, because I had seen fisheries destroyed by over-dredging under my own nose—fisheries where formerly a fisherman with a single dredge could go and catch his bushel or more of oysters in a day, but where now he cannot catch half a dozen—and I had heard of many similar cases of the same thing all round the coast. I attacked this reckless principle then as warmly as I could, and I have consistently done so year after year ever since, and I do not hesitate to say that the self-fertilizing theory has been the foundation of all opposition to improved legislation. I certainly never dreamt that the public would stand anything like the increase of price which oysters have reached, without sweeping this most noxious system of non-preservation away utterly. Practically, for myself and men of my class, native oysters have been annihilated. Luxurious old gourmands in the West-end clubs, and lively young speculators in the City, the cheeks on and in whose trousers bear no relative proportion, may still feel justified in spending 10s. on their luncheon—I don't; and I earnestly desire to see the time when I can once more get my dozen of natives, glass of stout, and bread and butter for a shilling as I used to do. There is no *natural* reason why I should not. Of that I am persuaded.

Letter D., December 9th, 1876.

From Mr. W. FELL WOODS.

THE BREEDING OF THE OYSTER.

I FEAR that my reference to Mr. Francis's first letter as "courteous" must have been misinterpreted by him as being ironically intended. I can assure him it was not so; but that I wished to intimate in what spirit I understood his strictures to be offered, and that I desired to follow so good an example, thus guarding against a false impression to which otherwise any accidental expression might give rise.

I am glad to feel that, whatever cogency there may be in Mr. Francis's arguments as against the theories of those whose views he is really combating, they have very little application to mine. No misuse of the self-fertilizing theory can prove it erroneous, nor can any such abuse be laid to my charge.

In reference to the early spatting of oysters, the cases mentioned by Capt. Johnson of the two-year-olds in 1874, and the one-year-olds on a previous occasion, tend to confirm the result of my observations as to this ability stated in my letter of October 25th; but I have never been able to assure myself that, in the particular case described by him of the spatting of the youngest, the crop acquired did not come from the Medina, from which it certainly might then have been received; and, in the instances in which the ponds have not been for some time dried, there is always a possibility of older oysters being left in the pond, which clearly may have happened in 1874.

* * * *

Forest Hill.

Letter E., December 2nd, 1876.

From Mr. W. FELL WOODS.

EXTENDED CULTIVATION OF THE NATIVE OYSTER.

MY own theory being that the progeny of an oyster would follow its parentage, I put it to the test in 1869, with Essex natives and other oysters, as I have already made known, and it was then first proved by me on a large scale to be correct. Capt. Johnson's experience in 1872, related by Mr. Francis Francis, is therefore but a confirmation of this, and not an original discovery. It is, however, equally certain that local conditions influence their development, and the large rapid growth of this year's spat at Medina, some of which I saw more than an inch and a quarter in diameter when less than seven weeks old, seems to indicate a tendency to revert to the local type.

Forest Hill, November 27th.









